| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S41 | 132115 | supply with (order$3) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:18 |
| S42 | 28510 | S41 and (organization or entity or entities or department or corporation) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:27 |
| S43 | 28924 | S41 and (organization or entity or entities or department or corporation or enterprise) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:27 |
| S44 | 28924 | S43 and (resource or supply or supplies) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:27 |
| S45 | 1573 | S44 and (acquisition) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:29 |
| S46 | 711 | S45 and (acquire or acquiring) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:29 |
| S47 | 428 | S46 and request | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:29 |
| S48 | 457 | S46 and request$3 | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:30 |
| S49 | 268 | S48 and (valid or invalid or validation or validat$3) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:30 |
| S50 | 139 | S49 and agree$4 | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 16:31 |
| S51 | 59 | S50 and approv$3 | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 17:14 |
| S52 | 36 | S51 and (vendor or supplier or distributor or provider or fulfiller) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/21 17:14 |
| S53 | 2144 | select$3 adj (vendor or distributor or merchant or supplier) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 11:42 |

| | | | | | | |
|---|---|---|---|---|---|---|
| S54 | 0 | S53 and (acquir$3 adj (entit$3 or organization)) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 11:43 |
| S55 | 20 | S53 and (acquir$3 near (entit$3 or organization)) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 14:22 |
| S56 | 56 | ("5970475").URPN. | USPAT | OR | ON | 2005/09/23 12:57 |
| S57 | 1507 | 705/8.ccls. | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 14:22 |
| S58 | 15813 | S53 nad S57 | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 14:22 |
| S59 | 43 | S53 and S57 | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 14:22 |
| S60 | 1 | S59 and (acquir$3 near (entit$3 or organization)) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 14:23 |
| S61 | 22 | S59 and (acquir$3) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 14:23 |
| S62 | 27 | S59 and (acquir$3 or procurement or procur$3) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/23 14:23 |

Kwok

0 = Reviewed all

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| L1 | 165 | electronic adj procurement | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/28 16:24 |
| L2 | 87 | 1 and organization | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/28 16:24 |
| L3 | 103 | 1 and (enterprise or organization or chain) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/28 16:24 |
| L4 | 73 | 3 and entit$3 | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/28 16:25 |
| L5 | 1 | 4 and (aggregat$3 adj (order or purchase or request)) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/28 16:27 |
| L6 | 0 | ("2003/0065573").URPN. | USPAT | OR | ON | 2005/09/28 16:27 |
| L7 | 1 | 4 and (aggregat$3 near (order or purchase or request)) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/28 16:27 |
| L8 | 4 | 4 and (aggregat$3 with (order or purchase or request)) | US-PGPUB; USPAT; EPO; JPO; DERWENT | OR | ON | 2005/09/28 16:27 |
| L9 | 0 | ("6850900").URPN. | USPAT | OR | ON | 2005/09/28 16:37 |

Rick-T

0 = reviewed all

```
? show files;ds
File 348:EUROPEAN PATENTS 1978-2005/Sep W03
         (c) 2005 European Patent Office
File 349:PCT FULLTEXT 1979-2005/UB=20050922,UT=20050915
         (c) 2005 WIPO/Univentio
File 347:JAPIO Nov 1976-2005/Apr(Updated 050801)
         (c) 2005 JPO & JAPIO

Set     Items   Description
S1        218   (PROCURE OR PROCUREMENT OR ACQUIRE OR ACQUIRING) (N) (ELEC-
            TRONIC OR ONLINE OR VIRTUAL)
S2     687311   (ORGANIZATION OR ENTITY OR ENTITIES OR CHAIN OR ENTERPRISE
            OR COMPANY)
S3       7703   (ORDER OR PURCHASE OR REQUEST?) () (GOOD? OR SERVICE? OR S-
            UPPLY OR SUPPLIES OR EQUIPMENT)
S4        490   (MULTIPLE OR PLURALITY) () (VENDOR OR MERCHANT OR SUPPLIER?
             OR DISTRIBUTOR)
S5     761185   PROVIDER OR AGENT
S6      88762   (VENDOR OR MERCHANT OR SUPPLIER? OR DISTRIBUTOR)
S7          3   S1 AND S2 AND S3 AND S4 AND S6
S8         11   S1 AND S2 AND 3 AND S4 AND S5
S9          3   S8 NOT PY=>2002
?
```

0 = all reviewed 9/28/05

```
THIS IS THE FULL-TEXT.   Copyright MCB University Press Ltd 1994
? show files;ds
File  15:ABI/Inform(R) 1971-2005/Sep 28
         (c) 2005 ProQuest Info&Learning
File  16:Gale Group PROMT(R) 1990-2005/Sep 27
         (c) 2005 The Gale Group
File 148:Gale Group Trade & Industry DB 1976-2005/Sep 28
         (c)2005 The Gale Group
File 160:Gale Group PROMT(R) 1972-1989
         (c) 1999 The Gale Group
File 275:Gale Group Computer DB(TM) 1983-2005/Sep 27
         (c) 2005 The Gale Group
File 621:Gale Group New Prod.Annou.(R) 1985-2005/Sep 28
         (c) 2005 The Gale Group
File 268:Banking Info Source 1981-2005/Sep W2
         (c) 2005 ProQuest Info&Learning
File 626:Bond Buyer Full Text 1981-2005/Sep 27
         (c) 2005 Bond Buyer
File 608:KR/T Bus.News. 1992-2005/Sep 28
         (c)2005 Knight Ridder/Tribune Bus News

Set     Items   Description
S1      13144   (PROCURE OR PROCUREMENT OR ACQUIRE OR ACQUIRING) (N) (ELEC-
             TRONIC OR ONLINE OR VIRTUAL)
S2   17071284   (ORGANIZATION OR ENTITY OR ENTITIES OR CHAIN OR ENTERPRISE
             OR COMPANY)
S3      30949   (ORDER OR PURCHASE OR REQUEST?) () (GOOD? OR SERVICE? OR S-
             UPPLY OR SUPPLIES OR EQUIPMENT)
S4       8947   (MULTIPLE OR PLURALITY) () (VENDOR OR MERCHANT OR SUPPLIER?
              OR DISTRIBUTOR)
S5    3113383   PROVIDER OR AGENT
S6          0   S1(S)S2(S)S3(S)S4(S)S5
S7       4727   S1(S)S2
S8         12   S7(S)S3
S9          0   S8(S)S4
S10        10   S8 NOT PY=>2002
S11         8   RD (unique items)
S12        65   S1(S)S3
S13         0   S12(S)S4
S14   3233151   (VENDOR OR MERCHANT OR SUPPLIER? OR DISTRIBUTOR)
S15   5698066   (VENDOR OR MERCHANT OR SUPPLIER? OR DISTRIBUTOR OR PROVIDER
              OR PROCURER OR AGENT)
S16        19   S12(S)S15
S17        12   RD (unique items)
S18         9   S17 NOT PY=>2002
S19         0   S3 AND (AGGREGAT$3)
S20      1020   S3 AND (AGGREGATE OR AGGREGATING)
S21         4   S20 AND (REQUESTOR OR NON?REQUESTOR)
?
```

0= all reviewed 9/28/05

```
File   2:INSPEC 1969-2005/Sep W3
         (c) 2005 Institution of Electrical Engineers
File  65:Inside Conferences 1993-2005/Sep W4
         (c) 2005 BLDSC all rts. reserv.
File  99:Wilson Appl. Sci & Tech Abs 1983-2005/Jul
         (c) 2005 The HW Wilson Co.
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
         (c) 2002 The Gale Group
File  35:Dissertation Abs Online 1861-2005/Aug
         (c) 2005 ProQuest Info&Learning
File 474:New York Times Abs 1969-2005/Sep 28
         (c) 2005 The New York Times
File 475:Wall Street Journal Abs 1973-2005/Sep 28
         (c) 2005 The New York Times
File 169:Insurance Periodicals 1984-1999/Nov 15
         (c) 1999 NILS Publishing Co.
File 139:EconLit 1969-2005/Sep
         (c) 2005 American Economic Association

Set     Items   Description
S1        503   (PROCURE OR PROCUREMENT OR ACQUIRE OR ACQUIRING) (N) (ELEC-
              TRONIC OR ONLINE OR VIRTUAL)
S2       1452   (ORDER OR PURCHASE OR REQUEST?) () (GOOD? OR SERVICE? OR S-
              UPPLY OR SUPPLIES OR EQUIPMENT)
S3    1879074   (ORGANIZATION OR ENTITY OR ENTITIES OR CHAIN OR ENTERPRISE
              OR COMPANY)
S4        237   (MULTIPLE OR PLURALITY) () (VENDOR OR MERCHANT OR SUPPLIER?
              OR DISTRIBUTOR)
S5     139460   (VENDOR OR MERCHANT OR SUPPLIER? OR DISTRIBUTOR)
S6          5   S1 AND S2
S7        209   S1 AND S3
S8         56   S7 AND S5
S9         56   S7 AND S8
S10        54   RD (unique items)
S11        38   S10 NOT PY=>2002
S12         1   S11 AND (AGGREGATE OR AGGREGATING OR AGGREGATED)
S13         0   S11 AND (REQUESTOR)
?
```

O= reviewed 9/28/05

```
File   9:Business & Industry(R) Jul/1994-2005/Sep 27
         (c) 2005  The Gale Group
File  20:Dialog Global Reporter 1997-2005/Sep 28
         (c) 2005 Dialog
File 623:Business Week 1985-2005/Sep 22
         (c) 2005 The McGraw-Hill Companies Inc
File 624:McGraw-Hill Publications 1985-2005/Sep 28
         (c) 2005 McGraw-Hill Co. Inc
File 636:Gale Group Newsletter DB(TM) 1987-2005/Sep 27
         (c) 2005 The Gale Group
File 813:PR Newswire 1987-1999/Apr 30
         (c) 1999 PR Newswire Association Inc
File 810:Business Wire 1986-1999/Feb 28
         (c) 1999 Business Wire
File 610:Business Wire 1999-2005/Sep 28
         (c) 2005 Business Wire.
File 476:Financial Times Fulltext 1982-2005/Sep 28
         (c) 2005 Financial Times Ltd
File 613:PR Newswire 1999-2005/Sep 28
         (c) 2005 PR Newswire Association Inc
File 634:San Jose Mercury  Jun 1985-2005/Sep 27
         (c) 2005 San Jose Mercury News
File 625:American Banker Publications 1981-2005/Sep 27
         (c) 2005 American Banker

Set     Items   Description
S1      11083   (PROCURE OR PROCUREMENT OR ACQUIRE OR ACQUIRING) (N) (ELEC-
             TRONIC OR ONLINE OR VIRTUAL)
S2      26004   (ORDER OR PURCHASE OR REQUEST?) () (GOOD? OR SERVICE? OR S-
             UPPLY OR SUPPLIES OR EQUIPMENT)
S3          0   *deleted*  (ORDER OR PURCHASE OR REQUEST?) () (GOOD? OR SE-
             RVICE? OR SUPPLY OR SUPPLIES OR EQUIPMENT OR RESOURCE) () (AG-
             GREGATE OR AGGREGATING)
S4     100157   (ORGANIZATION OR ENTITY OR ENTITIES OR CHAIN OR ENTERPRISE
             OR COMPANY) () (RESOURCE OR GOOD? OR SERVICE?)
S5        223   S1 AND S2
S6         15   S5 AND S4
S7         12   RD (unique items)
S8         11   S7 NOT PY=>2002
?
```

O= Reviewed 9/28/05

**11/9/5 (Item 2 from file: 16)**
DIALOG(R)File 16:Gale Group PROMT(R)


07228523 Supplier Number: 61530887 (THIS IS THE FULLTEXT)
**On Your Mark, Get Set...(Company Business and Marketing)**
Elgin, Ben
Sm@rt Reseller, v3, n4, p34
Jan 31, 2000
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 656
TEXT:

Two Web integrators make a stealth run at the latest emerging market.

BETTING HEAVILY THAT e-procurement is the next Internet services hot spot, two big-name Web integrators are about to make waves in this emerging market.

Indeed, both IBM Global Services and USWeb/CKS (see related story, below) are quietly fleshing out e-procurement practices, Sm@rt Reseller has learned.

**Online procurement** offers corporations a cheaper, more efficient way to **purchase goods** and services like office supplies or temporary personnel. Instead of shelling out $100 to manually process an order for, say, a dozen ballpoint pens, a **company** can use apps from outfits like Ariba and Commerce One to automate the process and trim costs to a couple of bucks.

International Data Corp. (IDC) is one of many research houses bullish on the online procurement market (see chart). According to IDC, Seattle-based Visio trimmed its average order-processing cost from $113 to $6 after installing an online procurement system.

Now, IBM is hoping to help additional customers benefit from such systems.

"(IBM)feels like this area is so important that we've split it out from our e-commerce practice to give it specific focus," says Karl Salnoske, VP of procurement services for IBM Global Services. Salnoske expects some official Big Blue announcements to surface soon. "(We're) bringing together all of our competencies and offerings in one place."

Meanwhile, USWeb/CKS is singing a similar tune. It plans to launch a procurement practice in the coming weeks, says a source inside the company.

Hinging on a core party of employees acquired in last year's Mitchell Madison Group purchase, the USWeb/CKS procurement effort reportedly will work with Ariba and Commerce One, as well as some homegrown purchasing software.

"The group is dedicated to optimizing the procurement channel ... helping the companies from buying too much stuff, or the wrong stuff," says the USWeb/CKS source, who requested anonymity.

This is welcome news for Commerce One, Ariba and other smaller competitors that are clamoring for mind share in this fledgling market.

Ariba grabbed some headlines last week by elbowing aside Commerce One to garner the full attention of IT services giant EDS (see related story, p. 35). The Plano, Texas-based integrator dished off its sizable investment in Commerce One to focus on a partnership inked with Ariba two weeks earlier. EDS insists the timing of the two deals is pure coincidence.

Still, Ariba appears to be the momentum play. As of late last week, the company's stock was trading near a 52-week high, and had risen more than $140 over the last year. Bank of America, attuned to the business-to-businessboom, upgraded Ariba shares Jan. 26.

Commerce One, meanwhile, isn't exactly hurting. Shares in the company are well below their 52-week high but have climbed more than $170 since

July. Along the way, Commerce One has inked deals with such services mammoths as Ernst & Young and PricewaterhouseCoopers. And just last week, it landed Fortune 500 player Eli Lilly as a customer.

With Big Blue and USWeb/CKS poised to dive in, the e-procurement opportunity appears to be ripening by the week.

Sales Boom

Number of users, Internet commerce procurement applications (in millions)

1999 .7
2003 250
Source: IDC, 1999

Wedding Turns Ugly

The pending marriage of USWeb/CKS and Whittman-Hart is off to a rocky start. Shares in both companies last week fell approximately 28 percent. The decline occurred after USWeb reported Q4 earnings that met--but did not exceed--analysts' expectations.

Most of the damage occurred after the Jan.26 close of our SR Services Stock Index.

At least one analyst says USWeb is a poorly managed company in a great niche, and Whittman-Hart is a deftly managed company in a bad niche.

The big question from this skeptical analyst: Will the combined companies be well run and in a great niche--or poorly run in a bad niche?

Neither USWeb/CKS nor Whittman-Hart could be reached for comment at press time.

Joseph C. Panettieri



PUBLISHER NAME: Ziff-Davis Publishing Company
COMPANY NAMES: *IBM Global Services; USWeb/CKS
EVENT NAMES: *360 (Services information); 220 (Strategy & planning)
GEOGRAPHIC NAMES: *1USA (United States)
PRODUCT NAMES: *7372702 (Computer Systems Integration (Contract))
INDUSTRY NAMES: BUSN (Any type of business); CMPT (Computers and Office Automation)
SIC CODES: 7373 (Computer integrated systems design)
NAICS CODES: 541512 (Computer Systems Design Services)
SPECIAL FEATURES: COMPANY
?

**11/9/7 (Item 4 from file: 16)**
DIALOG(R)File 16:Gale Group PROMT(R)


05618268 Supplier Number: 50038131 (THIS IS THE FULLTEXT)
**Streamline MRO purchasestreamline**
Industry Week, v247, n9, p14
May 4, 1998
ISSN: 0039-0895
Language: English Record Type: Fulltext
Article Type: Article
Document Type: Magazine/Journal; Trade
Word Count: 80
TEXT:
Organizations with large, nonproduction procurement requirements can streamline purchasing and make it more cost effective with a package of Web-based, **electronic procurement** solutions from Intelisys Electronic Commerce LLC, New York (www.iecsolutions.com). IEC **Enterprise** is an Internet-based maintenance, repair, and operations (MRO) procurement application allowing employees to **order supplies** directly from their desktop from electronic catalogs of contracted suppliers. Completed requisitions are routed through the **company** intranet for approval, then sent securely over the Internet to the designated supplier.

PUBLISHER NAME: Penton Publishing, Inc.
COMPANY NAMES: *Intelisys Electronic Commerce LLC
EVENT NAMES: *330 (Product information)
GEOGRAPHIC NAMES: *1USA (United States)
PRODUCT NAMES: *7372410 (Business Applications Software)
INDUSTRY NAMES: BUS (Business, General); BUSN (Any type of business)
NAICS CODES: 51121 (Software Publishers)
SPECIAL FEATURES: COMPANY
?

**11/9/18 (Item 5 from file: 583)**
DIALOG(R)File 583:Gale Group Globalbase(TM)


09431272
Suntec City tenants get e-supplies
SINGAPORE: E-PROCUREMENT FOR OFFICE SUPPLIES
Asia Computer Weekly (XCF) 04 Dec-10 Dec 2000 p.20
Language: ENGLISH

Up to 250 retail stores and 500 offices stationed in office towers, mall and Singapore International Convention & Exhibition Centre built by Singaporean developer, Suntec City, are offered with e- **procurement** < **electronic - procurement** > services for office supplies. The virtual marketplace that is jointly set up by VChain Solutions, provider of e-commerce solutions <electronic commerce> and Atos Origin, provider of IT <information technology> services <from France>, was put into operations in December 2000. In this regard, a round-the-clock call centre is operated by Atos Origin to extend aids to members of such e-procurement services. Meanwhile, in mid-January 2001, other e-commerce services that are based on application service provision will be jointly launched by the 2 **entities** . As anticipated by OfficeA2Z that has signed up as a **supplier** for the e-procurement services, orders can be secured by the firm with one-fourth of tenants stationed in Suntec City's buildings in 3 months' time <March 2001>.
COMPANY: OFFICEA2Z; ATOS ORIGIN; VCHAIN SOLUTIONS; SUNTEC CITY

PRODUCT: Stationers (5943); Property Development (6552PD); Office & Computing Machines (3570);
EVENT: Product Design & Development (33); Marketing Procedures (24); **Company** Formation (14);
COUNTRY: Singapore (9SIN); France (4FRA);
?

**8/9/6 (Item 4 from file: 20)**
DIALOG(R)File 20:Dialog Global Reporter


10075588 (THIS IS THE FULLTEXT)
**Infobank Int. Hldgs - Re Acquisition of Interest**
REGULATORY NEWS SERVICE
March 15, 2000
JOURNAL CODE: WRNS LANGUAGE: English RECORD TYPE: FULLTEXT
WORD COUNT: 1176

Infobank International Holdings plc ("Infobank")
Infobank takes 20 per cent stake in Australasian Distributor

Infobank, a leading international provider of business-to- business e-commerce software, announces that it is to take a 20% stake in Osmere Ltd, an Australian company which is to acquire the distributor of Infobank's products in Australasia, Online Advantage Pty Ltd. Osmere will be renamed Online Advantage Ltd. The consideration for the stake will be A$17.2 million (#6.7 million).

Following completion of its planned fundraising later this spring, Infobank will subscribe for 43 million Osmere shares at a price of 40 cents per share, representing a 33.3% premium over the 30 cent issue price of a A$7.5 million placement and rights issue announced at the time Osmere unveiled its initial agreement to **acquire Online** Advantage, in February 2000.

Infobank will also receive the right to take up 21.5 million options over Osmere shares exercisable at a price of 40 cents each. These options are exercisable for a period of five years and enable Infobank to increase its holding in Osmere at a later date.

It was announced on 20 December 1999 that Infobank had appointed Online Advantage as a distributor for Australasia. Infobank today extended this by appointing Online Advantage as its exclusive distributor for its InTrade suite of products in the Australasia region for a five year period. Under the terms of the distribution agreement, Online Advantage will represent Infobank in Australasia, driving the sales of InTrade software and providing full training and support to Infobank's Channel Partners and e-Hub operators in the region.

Osmere's Chairman, Mr George Jones, said: "This new placement provides us with a significant cash injection for the Company while cementing our alliance with one of the world's leading e- commerce groups. This will position us to accelerate our expansion plans by 12-18 months, elevating Online Advantage to the major league as a partner of one of the leaders in the business to business e-commerce space."

Online Advantage's Managing Director, Mr Brian Heitner, said: "Our strategic partners and customers are very supportive of the association with Infobank, recognizing that it gives us the strategic leverage and market presence to support our expansion plans throughout the region. Infobank is committed to becoming a major player in the Australasian region. Having now worked with Infobank for a number of months, we have concluded that the Infobank range of products are "best of breed" in our market space and have enormous potential in this part of the world, particularly through their unique single system multinational capabilities."

Graham Sadd, CEO of Infobank, said: "The business to business e-commerce market in Australia is developing rapidly, and is in some respects already ahead of Europe. Online Advantage, which has historically been deeply involved in e-commerce, has completely positioned itself behind InTrade and is already involved in many high profile e- commerce opportunities in the region. This equity investment enables our interests

to be closely aligned whilst enabling Online Advantage to create a major business in its own right."

"In addition, Online Advantage has over the last six years developed its own proprietary "Infomediary" products and services, enabling both suppliers and buyers to trade with one another irrespective of their own 'back-end' systems. The combination of these technologies and InTrade will allow all members of trading communities to participate, no matter what their current technology position may be."

- Ends -

For further information, please contact:

Infobank International Holdings plc 01753 799500 Graham Sadd - CEO, Infobank International Holdings plc Email:grahams@infobank.co.uk Web: www.infobank.co.uk

Osmere Ltd 00 61 412 949 250 George Jones - Chairman

Online Advantage Pty Ltd 00 61 412 223 262 Brian Heitner - Managing Director

Square Mile Communications 0171 601 1000 Nick Oborne Email: nick.oborne@sq-mile.com

Notes to editors:

About Online Advantage

Online Advantage Pty Ltd (OLA) was established in 1993 with a focus on Business to Business e-commerce. During the period from its inception to 1999, the primary focus of the company has been the delivery of e-commerce procurement and enablement solutions to businesses in Australia.

The Company secured the rights to the Australasian distributorship of the Infobank InTrade suite of e-commerce products in December 1999. Since then, the focus and direction of the Company has shifted to a significantly higher tier position in the market place. OLA is now seeking to leverage its existing credentials with the software of Infobank to become a major player in the local B2B e-commerce market. Infobank InTrade software provides sophisticated e-commerce **purchase** , **supply** and E-Hub capability previously not seen in the Australian market.

OLA has over the past 7 years built a business with more that 70 hosted e-commerce customers. Today there are over 6000 desktops that currently utilise the OLA e-commerce solutions to transact electornically. The products servicing the needs of customers range from general ISP and e-mail services to intranets, web sites, electronic ordering, translation and network services through to total e-commerce supply chain and value chain solutions.

The company is actively pursuing the immediate goals of securing a number of major customer contracts from ongoing negotiations.

About Infobank Infobank International Holdings plc ("Infobank") is a leading international provider of business-to-business e-commerce software. Founded in 1993 and quoted on AIM since February 1997, Infobank specialises in providing **electronic procurement** and delivery systems to the corporate market using Internet technologies. The group is well placed to exploit the rapid growth forecast worldwide for electronic commerce.

Its product suite includes:

InTrade e-Hub - Focusing on inter-business transactions, InTrade e-Hub enables organisations to create specific communities of buyers and suppliers to form customised online trading communities. InTrade e-Hub enables participating organisations on both sides of the trading relationship to reduce significantly the costs of purchasing and supply. As InTrade e-Hub is a hosted Web-based application, both buyers and suppliers are able to avoid developing and managing their internal electronic purchasing or electronic supply solutions.

InTrade Purchaser Enterprise Edition - An enterprise-level, internal system providing automated procurement, whilst leveraging and extending investment in **Enterprise Resource** Planning systems. Scalable across all

departments throughout the enterprise, this is targeted at organisations processing over 20,000 purchase orders per annum.

InTrade Purchaser Business Edition - An SME solution, providing smaller or fragmented organisations with internal, automated procurement. Maximum of 25 users. Targeted at organisations processing between 2,500 to 20,000 purchase orders per annum.

InTrade Supplier - Aimed at suppliers of all sizes, InTrade Supplier allows a supplier to automate and control its sales process on a customer specific basis and publish its electronic catalogue on the Web, enabling registered users to access it and buy goods, while maintaining supplier branding.

The entire InTrade product suite offers true single system multinational capabilities offering over 50 languages and currencies from a single installation.

Research by Warwick Business School reveals that e-commerce systems such as InTrade can reduce procurement and supply costs by up to two thirds. Gartner Group, the leading market research firm, has recently forecast that the worldwide market for business to business electronic commerce will expand to $7.3 trillion by 2004, more than 50 times larger than in 1999.

Website: www.intradeinvestor.co.uk



COMPANY NAMES: Infobank International Holdings PLC
DESCRIPTORS: Mergers & Acquisitions; Company News; Shareholdings
SIC CODES/DESCRIPTIONS: 6719 (Holding Companies NEC)
NAICS CODES/DESCRIPTIONS: 551112 (Offices of Other Holding Companies)
?

**18/9/4 (Item 1 from file: 16)**
DIALOG(R)File 16:Gale Group PROMT(R)


07899005 Supplier Number: 66008742 (THIS IS THE FULLTEXT)
**Bids for Broward County Public Schools Go Online With DemandStar.com.**
Business Wire, p2605
Oct 12, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 486
TEXT:
Business Editors/High-Tech & Education Writers

FORT LAUDERDALE, Fla.--(BUSINESS WIRE)--Oct. 12, 2000

Doing business with Broward County Public Schools just got easier. BCPS recently began posting bids online with DemandStar.com (OTCBB:DMND), an Internet-based marketplace that unites local government purchasers with **suppliers** of goods and services. This is considered a progressive move for the school district, which believes **online procurement** is a more efficient way for government agencies to **purchase goods** and services.

"More government entities across the United States are going online," said Art Hanby, Director of Purchasing with BCPS. "The goal in government purchasing is to get the best value for taxpayer's dollars through competitive bidding. We believe that posting our bids online helps us maximize the exposure of our bids. It broadens our reach to more suppliers. In addition, we expect to save time and reduce administrative costs associated with our bid process, which will allow us to concentrate our resources on supporting our schools."

As one of the fastest growing school districts in America (and the fifth largest), Broward County understands the need for attracting qualified suppliers. Hanby, who encouraged the district to go electronic after seeing a presentation about the DemandStar service, says, "The traditional practice of maintaining our own mailing list and mailing out bids just wasn't producing enough responses. By utilizing DemandStar's Internet technology, we expect to see an increase in the number of bids received."

DemandStar officials say that suppliers will also benefit. "Our service makes doing business with the government easier than ever," said Sam Chesser spokesman for the company. "Suppliers will no longer need to drive across town or call the school district's purchasing office to get bid packages. For much less time and effort they can receive bid opportunities automatically by email and download complete bid packages online -- anytime, 24-hours a day."

Suppliers can register online by county, state or nationally and gain access to all of the member agencies in their territory. It is not mandatory that suppliers register for the service. They can still choose to visit the agency to pick-up bid packages. However, the school district is hoping that most suppliers will take advantage of the technology and sign-up with DemandStar. The service is provided at no charge to the agency.

DemandStar is a publicly traded company under the symbol DMND (DMND.OB on some services).

DemandStar's online marketplace unites local government purchasers with suppliers of goods and services. The company currently has agreements with over 160 government agencies in 24 states along with thousands of suppliers, both domestic and international. Agencies or suppliers can learn more by calling the company at (800) 711-1712 or visiting www.DemandStar.com.

Except for the historical information contained herein, the matters

discussed in this news release are forward-looking statements that involve risks and uncertainties detailed in DemandStar.com's filings with the Securities and Exchange Commission, including Form S-1, as amended (file No. 333-93445).



PUBLISHER NAME: Business Wire
COMPANY NAMES: *DemandStar.com
GEOGRAPHIC NAMES: *1USA (United States)
PRODUCT NAMES: *4811524 (Teleshopping Services)
INDUSTRY NAMES: BUS (Business, General); BUSN (Any type of business)
SIC CODES: 4822 (Telegraph & other communications)
NAICS CODES: 514199 (All Other Information Services)
SPECIAL FEATURES: COMPANY
?

**9/TI,PN/1 (Item 1 from file: 349)**
DIALOG(R)File 349:(c) 2005 WIPO/Univentio. All rts. reserv.

**METHOD FOR AFFORDING A MARKET SPACE INTERFACE BETWEEN A PLURALITY OF MANUFACTURERS AND SERVICE PROVIDERS AND INSTALLATION MANAGEMENT VIA A MARKET SPACE INTERFACE**
**PROCEDE DE MISE A DISPOSITION D'UNE INTERFACE D'ESPACE DE MARCHE ENTRE UNE PLURALITE DE FABRICANTS ET DES FOURNISSEURS DE SERVICES ET GESTION D'UNE INSTALLATION VIA UNE INTERFACE D'ESPACE DE MARCHE**
Patent and Priority Information (Country, Number, Date):
Patent: WO 200139028 A2 20010531 (WO 0139028)

**9/TI,PN/2 (Item 2 from file: 349)**
DIALOG(R)File 349:(c) 2005 WIPO/Univentio. All rts. reserv.

**METHOD AND SYSTEM FOR CONDUCTING ELECTRONIC AUCTIONS WITH NET PRESENT VALUE BIDDING**
**PROCEDE ET SYSTEME DE CONDUITE DE VENTES AUX ENCHERES ELECTRONIQUES PAR L'INTERMEDIAIRE D'OFFRES A VALEUR ACTUELLE NETTE**
Patent and Priority Information (Country, Number, Date):
Patent: WO 200058896 A2 20001005 (WO 0058896)

**9/TI,PN/3 (Item 3 from file: 349)**
DIALOG(R)File 349:(c) 2005 WIPO/Univentio. All rts. reserv.

**ELECTRONIC CATALOG AND SHARED ELECTRONIC TRANSACTION SYSTEM**
**CATALOGUE ELECTRONIQUE ET SYSTEME DE TRANSACTION ELECTRONIQUE PARTAGE**
Patent and Priority Information (Country, Number, Date):
Patent: WO 200021012 A2 20000413 (WO 0021012)
? t s9/full/3

**7/TI,PN/1 (Item 1 from file: 348)**
DIALOG(R)File 348:(c) 2005 European Patent Office. All rts. reserv.

**Method, apparatus, and system for synchronizing timing of an auction through a computer network**
**Verfahren, Vorrichtung und System zum Synchronisieren einer Versteigerung in einem Computernetzwerk**
**Methode, appareil et systeme pour la synchronisation d'une vente aux encheres a travers un reseau d'ordinateurs**
PATENT (CC, No, Kind, Date): EP 1220126 A2 020703 (Basic)
EP 1220126 A3 040102

**7/TI,PN/2 (Item 1 from file: 349)**
DIALOG(R)File 349:(c) 2005 WIPO/Univentio. All rts. reserv.

**METHOD FOR AFFORDING A MARKET SPACE INTERFACE BETWEEN A PLURALITY OF MANUFACTURERS AND SERVICE PROVIDERS AND INSTALLATION MANAGEMENT VIA A MARKET SPACE INTERFACE**
**PROCEDE DE MISE A DISPOSITION D'UNE INTERFACE D'ESPACE DE MARCHE ENTRE UNE PLURALITE DE FABRICANTS ET DES FOURNISSEURS DE SERVICES ET GESTION D'UNE INSTALLATION VIA UNE INTERFACE D'ESPACE DE MARCHE**
Patent and Priority Information (Country, Number, Date):
Patent: WO 200139028 A2 20010531 (WO 0139028)

**7/TI,PN/3 (Item 2 from file: 349)**
DIALOG(R)File 349:(c) 2005 WIPO/Univentio. All rts. reserv.

**METHOD AND SYSTEM FOR CONDUCTING ELECTRONIC AUCTIONS WITH NET PRESENT VALUE BIDDING**
**PROCEDE ET SYSTEME DE CONDUITE DE VENTES AUX ENCHERES ELECTRONIQUES PAR L'INTERMEDIAIRE D'OFFRES A VALEUR ACTUELLE NETTE**
Patent and Priority Information (Country, Number, Date):
Patent: WO 200058896 A2 20001005 (WO 0058896)

8/9/8 (Item 6 from file: 20)
DIALOG(R)File 20:Dialog Global Reporter


04793321 (THIS IS THE FULLTEXT)

# Concur Technologies Ups the Ante on Web Procurement with Release of CompanyStore 5.0

BUSINESS WIRE
March 29, 1999
JOURNAL CODE: WBWE LANGUAGE: English RECORD TYPE: FULLTEXT
WORD COUNT: 1332

REDMOND, Wash.--(BUSINESS WIRE)--March 29, 1999--

AlliedSignal and Hearst Deploy Leading Procurement Solution via Concur's Employee Desktop to Integrate Processes Across the Enterprise

Concur Technologies (Nasdaq:CNQR), a leading provider of Intranet-based employee facing business applications, today announced the availability of CompanyStore(tm) 5.0.

AlliedSignal Inc. (NYSE:ALD), a worldwide advanced technology and manufacturing company, and The Hearst Corporation, one of the world's largest diversified communications companies, will be using CompanyStore. With this innovative release of Concur's leading Web-based procurement application, employees will have the ability to simultaneously access other employee facing solutions, in-house applications and third-party Internet/extranet services, via one common business portal -- Concur's Employee Desktop(tm) -- while fulfilling their procurement needs from purchase to payment.

CompanyStore is a full-featured Intranet-based procurement solution automating purchasing processes across the enterprise -- from pencils to PCs and from temporary services to spare parts. CompanyStore's One Click interface allows employees to easily order and track goods and services from their desktops. The transition from labor-intensive, paper-based processes to a centralized Web solution reduces operational and administrative processing costs, increases supplier leverage, controls procurement expenditure and improves overall employee productivity.

"Creating a lean and consistent purchasing process across all of our business units worldwide is a top priority. CompanyStore meets our needs for an end-to-end solution that not only streamlines the entire process, but also enables us to effectively negotiate with our suppliers," said John Dording, AlliedSignal's purchasing manager.

Furthermore, CompanyStore 5.0 is integrated with and delivered through Concur's flagship product Employee Desktop, an Intranet business portal that allows for the integration of employee facing applications, including Concur's Xpense Management Solution(tm) (XMS(tm)), with other business-critical applications, corporate information and employee support services.

"Single point solutions represent islands of efficiency within the enterprise. While they automate select processes, they also are fragmenting the corporate IT environment and creating redundancies," said Daniel Sholler, program director of META Group's Application Delivery Strategies service. "Tackling strategic cost-reduction initiatives such as procurement should be tied into a larger framework of business process consolidation to achieve maximum operational efficiencies and productivity."

"We selected a functionally superior and effective solution that would enhance our ability to purchase efficiently and to negotiate prices strategically," said Tom Hughes, vice president and controller, The Hearst Corporation. "At the same time, we struggled with adding yet another application onto an already crowded desktop. CompanyStore 5.0, combined with the Employee Desktop, is the ideal solution because it not only offers

strategic procurement but integrates our business processes under a uniform interface -- a benefit our employees will greatly appreciate."

CompanyStore's open and flexible architecture solves one of the biggest problems in **online procurement** today catalog maintenance -- by allowing companies to work with any vendor's catalog regardless of format or maintenance and access preferences. Customers can access catalog data internally, by direct links to supplier sites or through external catalog-content aggregators. CompanyStore is embracing a wide range of industry standards and emerging technologies, including OBI and XML. In addition, a future version of this product will support Biz Talk. Microsoft recently announced this cross-platform e-commerce framework that will make it easy for businesses to integrate applications and conduct business over the Internet with trading partners and customers. Concur's CompanyStore is built on the Microsoft commerce platform, which includes Windows NT Server 4.0, SQL Server 7.0 and Site Server 3.0, Commerce Edition.

"Concur and Microsoft share a common vision -- to bring together buyers and sellers using a standardized language to expedite the exchange of business-critical data," said Michael Pinckney, commerce marketing manager, Microsoft Corp. "By utilizing Microsoft's commerce platform, CompanyStore addresses the communication challenges associated with businesses that have divergent platforms, operating systems and underlying technologies. It is truly exciting to have Concur standardize on the Biz Talk framework to accelerate e-commerce integration."

Usability and ease of deployment are significantly enhanced in CompanyStore 5.0. Graphical workflow gives users and managers a clear view of the purchasing process and can be customized to fit each company's unique business procedures. Employees can easily attach documents to purchase orders to substantiate purchases and facilitate approval. A robust set of reporting/analysis tools improves companies' negotiating power with vendors and suppliers.

Additionally, CompanyStore 5.0 brings cost-saving and productivity-enhancing capabilities to companies with Oracle, PeopleSoft and SAP **enterprise resource** planning (ERP) environments. These features, coupled with Concur's deployable technology, comprehensive administration tools and rapid implementation methodology, ensure companies can generate significant and immediate return on investment.

"We are raising the standard of Web procurement to new heights with CompanyStore 5.0," said Steve Singh, president and chief executive officer of Concur. "The solution does not end with a fully-automated procurement process. Integration with Concur's Employee Desktop ties this and other business processes together into one streamlined chain of efficiency and productivity. The positive impact on employee productivity and on a company's bottom-line will be tremendous."

About CompanyStore

CompanyStore streamlines corporate procurement by utilizing a simple browser interface that enables employees to easily **order supplies** and services while tracking the information and order status from their desktops. The solution allows companies to establish levels of approval, control the products and services offered, define ordering limits and streamline workflow. Because it is quickly implemented, easy to use, easy to administer and easy to configure, CompanyStore quickly decreases procurement processing costs across the enterprise.

About AlliedSignal

AlliedSignal Inc., headquartered in Morris Township, New Jersey, USA, is a US $15-billion advanced technology and manufacturing company serving customers worldwide with aerospace and automotive products, chemicals, fibers, plastics and advanced materials. The company employs 70,400 people worldwide. AlliedSignal is a component of the Dow Jones Industrial Average and Standard and Poor's 500 Index, and was named by Fortune magazine as the

most admired aerospace company, both in the U.S. and globally. Fortune also included AlliedSignal in its list of the "100 Best Places To Work In America." Forbes Global listed AlliedSignal in 1999 as the world's best diversified company. More information on AlliedSignal is available on the World Wide Web at http://www.alliedsignal.com.

About Hearst

The Hearst Corporation is one of the world's largest diversified communications companies. Its major interests include newspaper, magazine, book and business publishing; television and radio broadcasting; cable network programming; newspaper features distribution; television production and distribution; and new media activities. More information on Hearst Corporation is available on the Internet at www.hearstcorp.com

About Concur

Concur Technologies was founded in 1993 to automate costly, inefficient business processes that otherwise consume valuable time and resources. Concur develops and supports a suite of Web-based employee facing solutions for automating key business processes across the corporate enterprise.

Concur has licensed its products to over 175 enterprise customers. Its flagship product, Employee Desktop(tm), integrates Concur's suite of employee facing applications through a common user interface, and provides a business portal through which corporate customers and third parties can deliver other information and services to employees. Concur's Xpense Management Solution(tm) (XMS(tm)) is the leading enterprise software for travel expense management, automating processes across hundreds of thousands of desktops. CompanyStore(tm), Concur's enterprise software for automating procurement, reduces the time and resources required to research and **order supplies** , equipment and other non-production office goods and services.

Formerly Portable Software Corporation, Concur is based in Redmond, Washington.

Employee Desktop(tm), Xpense Management Solution(tm), XMS(tm), and CompanyStore(tm) are trademarks of Concur Technologies. All other company or product names are trademarks and/or registered trademarks of their respective owners. This press release contains forward-looking statements that involve risks and uncertainties that could cause actual results to differ materially from current expectations. Statements made in this release that relate to future plans, events or performances or statements containing words such as "believes," "anticipates," "plans," or "expects" are forward-looking statements. These statements are based on current expectations and involve risks and uncertainties. Factors that could cause or contribute to actual results differing from current expectations include, but are not limited to, the Company's limited operating history, which makes the prediction of future operating results difficult, risks associated with international operations, difficulties associated with strategic relationships, and uncertainty of market acceptance of the Company's products.



DESCRIPTORS: New Products & Services; Marketing; Company News
COUNTRY NAMES/CODES: United States of America (US)
REGIONS: Americas; North America; Pacific Rim
PROVINCE/STATE: Washington; New York
SIC CODES/DESCRIPTIONS: 7372 (Prepackaged Software); 2711 (Newspapers); 2700 (Printing & Publishing)
?

**21/9/1 (Item 1 from file: 15)**
DIALOG(R)File 15:ABI/Inform(R)


00952033 96-01426
**An exploration of concepts in system integration**
Mejabi, Olugbenga O
Integrated Manufacturing Systems v5n4,5 PP: 5-12 1994 ISSN: 0957-6061
JRNL CODE: ING
DOC TYPE: Journal article LANGUAGE: English LENGTH: 8 Pages
SPECIAL FEATURE: Charts Diagrams References
WORD COUNT: 5605
GEOGRAPHIC NAMES: US

DESCRIPTORS: Systems integration; Process controls; Manufacturing; Advantages; Applications; CIM; Studies
CLASSIFICATION CODES: 5240 (CN=Software & systems); 5310 (CN=Production planning & control); 9190 (CN=United States); 9130 (CN=Experimental/Theoretical)

ABSTRACT: As manufacturing becomes even more competitive, integration will come to be seen as a means whereby performance can be improved while flexibility is simultaneously being enhanced. Consequently, a fundamental analysis of the concept on integration is conducted to determine its essential properties. It is expected that this will lead to a better understanding of the concept and also to applications in manufacturing environments that might ultimately lead to a full realization of computer integrated manufacturing.

TEXT: Introduction

According to Hsu and Rattner[1] integration can be defined as "the degree to which productivity approaches a theoretical upper bound". Implicit in this definition is the synergistic contribution of the components of a system to the performance of the whole. Interfacing of subsystems within a larger system is but one of several requirements for the achievement of true integration. True integration requires that control over a system can be accomplished towards the attainment of global system goals, and furthermore, subsystems must contribute towards the global goals irrespective of what their own local goals may be.

This article explores many of the issues involved in analysis and design of integrated systems. The exploration is with reference to general integrated systems, without assuming any particular integration architecture, and is presented on a conceptual level. To add substance to the abstract concepts, illustrations are given in terms of manufacturing and manufacturing systems.
In manufacturing systems two types of integration are possible. On the one hand there exists fixed integration wherein the configuration specifying the combination of subsystems into a larger system is rigid and cannot be modified. On the other hand, there exists flexible integration whereby subsystems are combined in a loose configuration. In such a case the configuration is easily modified in response to changing requirements. The ability to achieve computer integrated manufacturing (CIM) will be predicated on a clear understanding of the integration concept, its applications, and the distinctions and trade-offs between fixed and flexible integration.

The article is outlined as follows. First, the required modelling

terminology and definitions are presented. This is followed by a discussion of system functionality as it relates to integrated systems. Of particular interest is the ability of entities to put their functionality at the disposal of other entities. Next is a description of the important role played by goals in the dynamics of systems composed of autonomous entities. The following section explores the concept of control as the mechanism for guiding integrated systems towards attainment of their goals. Two necessary requirements for integration, relationships and communication are presented, as well as their use in developing architectures for integrated systems. Lastly, four classification schemes for understanding integrated systems are outlined and their implications are discussed.

## DEFINITION OF CORE CONCEPTS AND MODELLING TERMINOLOGY

To avoid ambiguity, this glossary will clarify the sense in which certain terms are used in the article. This is particularly important in those instances where the terms have somewhat different connotations from those found in common usage.

Control includes all activities to direct a system towards the attainment of specified goals. Included in this concept is sensing or determination of goal compliance, decision making to determine actions most consistent with goal attainment, and the actual execution to carry out indicated actions.

An entity is the smallest atomic object (however pragmatically determined) of which a system is composed. Examples in manufacturing include parts, processing equipment, material handling devices and control computers.

Subsystems are the set of lower-level systems formed by hierarchical decomposition of a system. Each subsystem is a logical grouping of one or more entities in such a way that the resulting subsystem can be thought of as having definite properties, behaviours and functionality. To permit representation using different abstractions, a subsystem may also be viewed as an entity or as a system by itself. The components of integrated systems are called subsystem entities. A relationship constitutes "awareness" by one entity of another (the related entity). Implicit in the relationship is some expectation as to the properties, behaviours, and functionality of the related entity.

## SYSTEM FUNCTIONALITY

All systems exist for the purpose of performing certain defined functions. In general, functions could be actions which alter the system or environment state or activities which provide some desired output. For example, manufacturing systems are designed and built for the express purpose of adding value to manufactured goods, while material handling devices are designed to move items, physically, from one location to another.

An integrated system must capitalize on the capabilities provided by its subsystem entities in providing its own functionality. An entity (the **requestor** ) **requests services** of another entity (the provider) in order to take advantage of functionality that is available from the provider. In return, the provider might provide the **requested service** or decline to do so. This is known as a service activity. As in bidding schemes (see [2], for example), there might be more than one potential performer. In such cases, a selection process is needed to identify the most suitable performer.

The following protocol provides the basis for a complete cycle of service request and service provision. Below are protocol aspects that are required.

* invocation;

* request;

* offer to perform;

* declination;

* acceptance;

* performance;

*appeal;
* termination; and

* conclusion.

Each protocol aspect corresponds to a set of messages (with optional arguments) that pass between the entities involved in a service activity. To start, the **requestor** must attract the attention of the performer (the performer might be simultaneously engaged in other activities) by an invocation. This initial step requires that an appropriate relationship exist between the **requestor** and the performer. Next, a request, along with all relevant details of the terms under which the service is being requested, is passed to the performer. The performer will then, optionally, make an offer to perform. The terms under which service can be provided are also specified at this point. As part of the protocol, service terms represent the mutual agreement between **requestor** and provider as to all relevant details pertaining to the "how", "when" and "where" of the service activity.

The requester then has an opportunity to accept or decline one or more of the offers received. On receipt of an acceptance, a performer can proceed to carry out the service. The performer must have, at this time, the data that are required for the service to proceed. It must also posses all inherent functionality for performing the service, or alternately, posses relationships with other entities to which all or part of the service can be delegated. If delegation is used, the protocol is again employed in a recursive fashion. During the time that it takes to perform the service, the requester can terminate the service and the performer can appeal for a termination, a reconsideration of service terms, or merely request additional data required for performing the service. Ultimately, after service completion, the service activity is concluded by the performer by reporting completion to the requester and then being freed from all obligations relative to the service.

If needed, certain steps of the protocol may be repeated. This is necessary if certain service terms or conditions turn out to be unacceptable to either party. In this mode each entity will negotiate by revising its position on such terms until agreement is reached.

The client-server model[3] provides an illustration of service activities in application. However, most client-server systems currently in use, represent only a subset of the features required by the protocol described above.

GOALS

Goals, whether implicit or explicit, provide the main motivation behind decision making. For the study of integrated systems, it is important to understand the manner in which subsystem entities act towards, or detract from, attainment of system goals. In idealized decision making we can link causation between goals, decisions, and consequences[4]. The set of goals is represented by C = {g sub 1 , g sub 2 , g sub 3 ,...}, alternatives are represented by A = {a sub 1 , a sub 2 , a sub 3 ,...}, and each alternative can be decomposed into a set of decision variables, D = {d sub 1 , d sub 2 , d sub 3 , ...}, where each alternative corresponds to some unique setting of the d sub j s. For each alternative a sub j that is selected in the decision-making process, a unique set of decision consequences will result. In idealized decision making the aim is to select an alternative a sub j which generates a consequence vc sub j that is closest to, or better than, G in value.

We assume, without loss in generality, that subsystem entities in integrated systems are, to a large extent, autonomous and therefore possess inherent goals of their own which they seek to fulfil. These subsystem goals may (or may not) be compatible with system goals in the sense that, left to themselves, they result (or do not result) in consequences that are substantially dissimilar from system goals.
In designing integrated systems, mechanisms must therefore be put in place to ensure compatibility between subsystem entity goals and system goals. Such a mechanism might involve goal decomposition or hierarchical control. Both concepts will be discussed later.

For manufacturing systems (the system), goals or performance objectives often include cost minimization, quality maximization or flexibility maximization. Workstations (the subsystem entities), on the other hand, typically have performance objectives which include maximization of utilization and minimization of local inventory levels. For either case, these can be combined into a composite system goal G, and goal satisfaction can be viewed in terms of an optimization problem with one or more constraints.

CONTROL

In integrated systems, control can be viewed as the scheme by which a system ensures that goals are attained, either in totality or as closely as possible. The view of control as synchronization and directing of activities is compatible with the view of control as providing a trajectory towards goal attainment. The former is merely a more narrow and concrete depiction of the latter.
This exploration considers the generalized problem of reconciling goals among autonomous entities. The case of master-slave relationships that are implied in nonautonomous systems degenerates into simplistic control where slave entities are directed to actions arrived at on the basis of master entity goals.

For system control, three generic types of functionality must be provided. These are sensing, decision making and action. Sensing is used to determine the state of a system in order for judgements to be made as to the degree to which system goals are being, or will be, achieved. As long as no exceptions are raised by the sensing system, the system may see no need to invoke any control actions. As soon as an exception is raised, however, the system must determine the best control action to apply in response to that specific occurrence. For this, decision-making functionality is required. Decision making determines what alternatives are available and then selects

one alternative. The alternative selected will be one whose consequences are most congruent with the system goals. Once a decision has been made, action functionality in the system can then be used to implement the decision. This typically involves a proactive change in system state.

From the point of view of integration, several issues relative to sensing, decision making and action will be discussed below.
Sensing involves the monitoring of system variables which may not always be localized within a single subsystem entity. It may be the case that a certain pattern of system states must be identified before an exception is raised. For this to occur, raw sensed data from two or more subsystem entities may need to be co-ordinated or combined before pattern comparisons can be made, especially since a pattern may be spatially and/or temporally distributed. This type of integrated sensing can be accomplished in a distributed fashion by disaggregating the overall pattern, making individual entities responsible for matching some portion of the disaggregated pattern, and then reintegrating the individual pattern deviations to determine if an exception will be raised or not.
Alternatively, sensing can be carried out in a centralized fashion. To do this, the pattern is kept intact and low-level sensed data is collected from subsystem entities, combined into a composite "footprint", and then compared directly to the pattern. Each approach has important implications in terms of processing overhead, sensing complexity that can be handled, and potential sensing accuracy.

For decision making, the need for congruence between subsystem entity goals and system goals must be emphasized. Goals drive the whole decision-making process, and lack of congruence will either result in large deviations from system goals, or preclude the possibility that a decision can be made at all. Goal congruence can be determined by decomposing system goals into domains that map onto subsystem entity goal domains, and then evaluating the fit between each decomposed goal and its counterpart entity goal. On the other hand, an **aggregate** goal can also be derived from the combined goals of subsystem entities. The **aggregate** goal can then be checked for congruence against system goals. In cases where subsystem entities are predisposed to accept nonnative goals, system-decomposed goals can be impressed on these entities to achieve better congruence with system goals. Mechanisms for this include "suggestion", "influencing", or "imposition", depending on the degree of autonomy permitted, and on how critical it is that those particular goals be met.

Since decision making typically involves selection from a set of alternatives, integrated systems must provide mechanisms for subsystem entities to be involved in any analyses to determine the preferred alternative. Minimally, the mechanism must provide for:

* decomposition of alternatives into the local contexts of individual subsystem entities;

* local analysis within subsystems; and
* recombination into a global context.

Local alternative analysis involves investigation of each alternative's consequence to determine which one produces a resultant state closest to the local goals that exist. In other words, the aim here is to maximize the degree of local goal satisfaction. In recombination of local analysis results, it may be the case that a clear consensus emerges between subsystem entities or that there is widespread dissent as to which alternative is preferred. The integrated system decision mechanism must

contain protocols for conflict detection. A conflict is detected whenever dissent between subsystems exceeds some threshold limit and is indicative of lack of congruence between subsystem goals. The threshold represents the maximum amount of dissent that is permitted. Once conflict is detected, two options are available; the global system may impose a decision, or act more in the spirit of autonomous systems and attempt to resolve the conflict. Conflict resolution involves, first, identifying the source of the conflict, then seeking to eliminate it by goal modification for one or more subsystem entities, using additional suggested or imposed constraints, trading-off goals or analysis results, negotiation, or arbitration between subsystems identified as being in the locus of the conflict. Ultimately the mechanism should guarantee that a final global decision will be arrived at. On arriving at a decision, the final step involves decision implementation which is an action step. The mechanism for action is the same as described previously in the section on system functionality.

An illustrative example in manufacturing is the case of a hypothetical material handling system with several automated guided vehicles. In route planning mode, each vehicle has the goal to minimize the total distance it travels, while the system controller has as its goal to maximize throughput. For a particular time segment, a decision must be made as to the path that each vehicle will follow as it moves from one station to

another. When planning starts, each vehicle first determines the shortest distance path between stations, and results are reported back to the controller. The controller applies a path congestion and sensitivity function to the results to determine if the throughput can possibly be improved. The sensitivity function also determines e paths which cause the greatest constraint on throughput. In the event that throughput can be improved, the controller initiates another iteration of the planning process by allowing a relaxation in the requirement for all vehicles to use the shortest distance path. The iterative process continues until the controller determines that the current plan provides for maximization of system throughput.
Architectural issues that are central to integrated system designs include the manner in which goal management is performed, the philosophy relating to suggestion versus imposition, and the resultant decision-making performance. Decision-making performance is a function of the amount of deliberation required to arrive at a decision and the amount of time that it takes.

## REQUIREMENTS

All the mechanisms described so far depend on, and assume the existence of, certain requirements. The requirements are: existence of relationships between the subsystem entities and communication between the entities.

## COMMUNICATION

Communication makes data flow between entities, and therefore, the communication channel is the interface which exists between them. An analogy to human communication is useful for illustrating the communication requirements of integrated systems. The ultimate reason for communication is to convey information between entities. Arrival of certain information may trigger events which cause the recipient entity to react. The particular occurrences that are caused will depend on the informational content of the message. At the sending entity, the message is formulated based on a certain local context which is current at that time. When the message arrives, the recipient must also have access to a local context that is compatible to that of the sender, otherwise the desired response

will not be evoked. Using our human communication analogy, this corresponds to the understanding that results from a spoken message; both parties must have similar cultural contexts otherwise attempts at dialogue may result in confusion. The contextual view of communicated messages can be mapped onto the application layer of the seven layer open system interconnect (OSI) model of communication systems[5]. Since contexts or meanings cannot be directly transmitted over communication media, the sender of a message must convert the meaning into raw transmittable data chunks by using certain formatting rules. In reverse, the recipient must reconstruct the desired meaning by applying similar formatting rules to the data chunks received. Using our analogy, raw data chunks correspond to sounds and the formatting rules correspond to rules of the particular language in which the communication takes place. Raw data chunks map onto the physical layer of the OSI model. Table I illustrates the communication requirement from the viewpoint of computer system integration.

An additional consideration is the need for sufficient communication capacity, or bandwidth, to meet the needs of the integrated system. Capacity needs can be drastically different from one system to another, and depend, in part, on the size of the system, the communication network topology, the communications protocol(s) used, and the cumulative demand for communication resources generated by entities.

## RELATIONSHIPS

Relationships are the basis for all meaningful interaction. This can be thought of as a logical, not physical, link and must be differentiated from physical communication links. Relationship has more to do with "awareness" of the existence of another entity and having the capability to interact with that entity. Relationships can exist between any two (or more) entities within an integrated system. In fact an entity can even have a relationship with itself. Each relationship can have implicit or explicit meanings; these are assumptions or expectations that can be held to be valid in reasoning about the related entity. Relationships can be temporary or permanent. If temporary, the possibility of interaction ceases as soon as the relationship is terminated. Obviously, relationships are a prerequisite for one entity to communicate or take advantage of services provided by another. From an architectural point of view, the set of relationships between a group of entities can be viewed as a structure. For example, a hierarchical master-slave structure describes the relationship between one entity (the master) and a second group of entities (the slaves).

Object-oriented design[6-8] has utilized the concept of relationships to describe an arbitrary set of behaviours associated with a set of objects. Common relationships include "kind-of", for inheritance, and "part-of" for objects within groups. Other relationship types can also be defined to represent domain specific interactions that are possible between arbitrary sets of objects.

The entity-relationship approach[9] has evolved as a means of representing complex data structures in database systems. This technique is also well suited to representing entities and relationships in integrated systems of a generic nature. Indeed, there exist several documented cases of using the approach, or its extensions, to model computer integrated manufacturing (CIM) systems, see Vernadat[10] for example.

Figure 1 shows some symbols used in graphic representations of entity-relationship models. (Figure 1 omitted) These symbols can be used to create comprehensive models of complex systems for an investigation of

integration issues that are of interest.
The distinction between fixed and flexible integration revolves around the nature of relationships. If relationships are stable and the functionality assumptions implied by the relationships are unchanging, the integration scheme is considered to be fixed. If, on the other hand, relationships and/or the meaning of relationships are dynamic and can adapt based on changing external requirements, the integration scheme is flexible.

## ARCHITECTURES

An integration architecture is a conceptual model describing meta-level control, as well as basic rules and design constraints in a given application domain[11]. The patterns formed by permissible relationships in integrated systems are indicative of an underlying architecture. Conversely, once an architecture has been developed and documented, new systems can be instantiated based on the rules of the architecture.

Architectures are useful as an abstraction of the knowledge contained within a set of systems. Architectures can address everything from the types of functionality required in specified subsystem entities, relationships between entities (and therefore system structure), and relationship meanings between entities. For example, an architecture for manufacturing system control may specify that one factory controller will be related to a variable number of cell controllers in a hierarchical arrangement, and then proceed to specify responsibilities of each entity. In doing so, the implementation information needed is not necessarily supplied.

The design of architectures must reflect the requirements of the particular domain under consideration. On one hand architectures set constraints which limit the search space for designing specific integrated systems, and therefore promote efficiency. On the other hand they can limit the generality achievable in designing these systems. This underscores the need for care in architecture development.

Several integration architectures have been designed and are currently in use. For example, see [12-14].

## CLASSIFICATION SCHEMES

Many classifications of integrated systems are possible. Here we will consider four orthorgonal classification schemes and discuss some insights that are obtained. The classification schemes are:

(1) Functional homogeneity/heterogeneity of subsystem entities.
(2) Goal homogeneity/heterogeneity among autonomous subsystem entities.

(3) Decision-making control structure.

(4) Type of localization.

## FUNCTIONAL HOMOGENEITY

Subsystem entities in an integrated system either can provide largely overlapping functionality, or each could provide a unique set of skills. Homogeneous functionality provides a means for providing flexibility since decisions about how available functionality is used can be dynamically made in real time. This occurs in the case of a manufacturing system with a process-based layout where all machines in a department are similar in function. On the other hand, heterogeneous functionality is a means for

improving efficiency and eliminating redundancy. Such is the case for a product flow layout where all manufacturing processes required for a narrow family of products are grouped together into a single manufacturing line.

In general, selecting between homogeneous and heterogeneous functionality in an integrated system architecture design involves a trade-off between flexibility and efficiency. Rather than being on either extreme of the spectrum, real systems typically lie somewhere in-between full homogeneity and full heterogeneity.

## GOAL HOMOGENEITY

The degree of goal homogeneity in an integrated system has a major impact on the ease with which the system can be controlled. Where subsystem entity goals are homogeneous, the need for negotiation during decision making can be minimized. Integrated systems with heterogeneous goals, on the other hand, require elaborate mechanisms for decision making. This contributes to decision-making complexity.

Typically, architecture design for integrated systems will not specify any level of goal homogeneity, rather, subsystem entities to be included in the system are selected on the basis of specific functionality that they provide. If such entities are autonomous agents, the goal of each entity gets introduced into the system. The set of goals of all subsystem entities selected in this fashion implicitly determine the degree of goal homogeneity that exists.

In manufacturing systems, it is sometimes the case that cells (the subsystem entities) have different goals. Some cells may aim to maximize throughput, others may aim to minimize inventory levels, while others attempt to minimize the makespan of manufactured items. The challenge in such cases is to balance the goals, which in and of themselves may not be compatible.

Considering the entire manufacturing organization as the system permits a different view of goal homogeneity to be obtained. McMahon and Ivancevich[15] use the concept of concordance, applied in the context of manufacturing organizations, to investigate effects of goal homogeneity on system performance. Concordance is defined as the degree of agreement among members of hierarchical levels, on the amount and distribution of control within the managerial system. They view concordance as being related to system solidarity as well as predictability. This view is similar to that of Lawrence and Lorsch[16], who see integration of organizations as the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment. These researchers all seem to agree that goal homogeneity is often a predictor for the levels of communication, co-ordination and integration observed within an organization.

## DECISION-MAKING CONTROL

In integrated systems where the subsystem entities are autonomous agents with goals that may or may not be homogeneous, mechanisms are required to control the decision-making process. The mechanism may be based on negotiation, suggestion or influencing. These mechanisms are deemed to be democratic since final decisions are only arrived at after sufficient consensus is established. Conversely, the mechanism may be such that certain decisions are imposed on the subsystem entities. This mechanism is deemed to be autocratic since there is no requirement to build consensus.

Group decision making, in the context of unstructured strategic decision

making in organizations, has been explored by Mintzberg et al.[17]. The research identified different phases, namely: recognition, diagnosis, search, screen, design, judgement, analysis, bargaining and authorization, which the decision-making process goes through. The general model developed allowed the possibility that two or more phases might be concurrent.

Democratic decision making mechanisms are very robust in the face of changes, both internal and external, to the system. In other words, good decisions will be made even if many operating assumptions are violated. One possible drawback of democratic decision making, however, is that decision making might be inefficient, requiring long drawn-out processes of negotiation.
Autocratic decision making, on the other hand, tends to be highly efficient but much less robust. Efficiency is obtained by avoiding the overhead required to arrive at consensus. Robustness is sacrificed, however, because of the reliance on an explicit "chain of command". If the command chain is breached for any reason, system control may be in jeopardy. Idealized versions of democratic and autocratic decision making are merely two extremes on a continuous spectrum, and the particular balance between the two, specified in an integrated system architecture, must depend on the unique need for efficiency and robustness.

Scheduling for manufacturing systems provides a good illustration of the need for balance between democratic and autocratic decision making. Shaw[18] and Owens et al.[19] describe scheduling systems based on bidding which is, to some extent, a democratic decision-making process. On the other hand, traditional scheduling is autocratic since no consensus is sought. Rana and Taneja[20] consider both approaches for scheduling of automated guided vehicles. Taneja[21] clearly highlights the strengths and weaknesses of each approach in terms of efficiency and robustness.

## LOCALIZATION TYPES

Localization refers to the manner in which behaviours of a system are mapped onto its component subsystem entities. Bechtel and Richardson[22] describe three types of localization that are evident in generic systems. They are, in order of increasing complexity: direct localization, complex localization and integrated localization.

Direct localization, as shown in Figure 2, occurs when each main aspect of a system's behaviour can be attributed to a single subsystem entity. (Figure 2 omitted) In other words, to understand that aspect of the system's behaviour, one need only understand the behaviour of a single subsystem entity.

Complex localization (see Figure 3) involves two or more subsystem entities. (Figure 3 omitted) In this case, each input may be modified sequentially by several entities, before a final output is produced. Understanding an aspect of the system's behaviour requires a knowledge of all the subsystem entities involved as well as the sequence in which they operate.

Integrated localization, see Figure 4, involves two or more subsystem entities with at least one cyclic dependency, or feedback loop, between them. (Figure 4 omitted) Integrated localization is particularly complex because the cyclic dependencies introduce "chicken-and-egg" issues to be resolved before a full understanding of the system's behaviour can be obtained.

Flow of products through manufacturing systems can be described using one

of the three localizations. Direct localization corresponds to cases where individual products are manufactured exclusively within one cell. Complex localization involves products that are manufactured by feeding them linearly through a series of cells. Integrated localization involves products manufactured through a series of cells with the possibility of looping back, for rework, for example.

## CONCLUSION

This article has taken a broad look at issues related to the understanding, design and application of integrated manufacturing systems. Although the issues all relate to integrated systems of a generic nature, they are described here in the context of manufacturing systems. This is an essential first step towards the integration of humans, computers, and processing equipment into computer integrated manufacturing (CIM) systems.

Future work in this area will be to design architectures and mechanisms for CIM systems based on the issues outlined here. In addition, the temporal evolution of integrated systems is an important issue that is in need of further exploration. Specifically, future research should aim to discover the sufficient conditions for formation of integrated systems, the conditions for maintaining their existence, and various mechanisms which govern their dissolution.

## REFERENCES

1. Hsu, C. and Rattner, L., "Develop a Theoretical Model of Information Requirements in Concurrent Manufacturing Systems, Part II: A Theory of Integration", Proceedings of the 1993 NSF Design and Manufacturing Systems Conference, 1993, p. 1367.

2. Smith, R. and Davis, R., "Negotiation as a Metaphor for Distributed Problem Solving", Artificial Intelligence, Vol. 20 No. 1, 1983.

3. Inmon, W.H., Developing Client/Server Applications in an Architected Environment, QED Information Sciences Inc., Wellesley, MA, 1991.

4. Galpern, M. and Mejabi, O., "Goal-driven Measures for Predicting Computer Integrated Manufacturing Systems (CIMS) Performance", Proceedings, Sixth Conference with Industry, Lehigh University, Bethlehem, PA, 1992, p. 155.

5. Voelcker, J., "Helping Computers Communicate", IEEE Spectrum, March 1986, p. 61.

6. Booch, G., Object Oriented Design with Applications, Benjamin Cummings, Redwood City, CA, 1991.

7. Syvertsen, T.G., Lillehagen, F. and Loustad, M., "A Generic Object Model for Engineering Design", Proceedings of the Seventh International Conference TOOLS Europe, Dortmund, 1992.

8. Wirfs-Brock, R., Designing Object-Oriented Software, Prentice-Hall, Englewood Cliffs, NJ, 1990.

9. Chen, P.P.S., "The Entity-Relationship Model: Towards a Unified View of Data", ACM Transaction on Database Systems, Vol. 1 No. 1, March 1976, pp. 9-36.

10. Vernadat, F., "Modelling CIM Enterprises with CIM. OSA", Proceedings

Rensselaer's Second International Conference on Computer Integrated Manufacturing, 1990, p. 236.
11. Rossak, W., "Integration Architectures -- A Tool for System Development and Software Reuse", report, Institute for Integrated Systems Research, Department of Computer and Information Science, New Jersey Institute of Technology, NJ, 1991.

12. Best, L.J., Application Architecture -- Modern Large Scale Information Processing, Wiley, New York, NY, 1990.

13. Mittermeir, R.M. and Opitz, M., "Software Bases for the Flexible Composition of Application Systems", IEEE Transactions on Software Engineering, Vol. SE-13 No. 4, 1987, pp. 440-60.

14. OSCA, The Bellcore OSCA Architecture, Bellcore -- Bell Communications Research, Technical Advisory TA-STS-000915, Issue 2, July 1990.

15. McMahon, J. and Ivancevich, J.M., "A Study of Control in a Manufacturing Organization: Managers and Nonmanagers", Administrative Science Quarterly, Vol. 21 No. 1, 1976, pp. 66-83.

16. Lawrence, P.R. and Lorsch, J.W., Organization and Environment, Irwin, Homewood, IL, 1969.
17. Mintzberg, H., Raisinghani, D. and Theoret, A., "The Structure of 'Unstructured' Decision Processes", Administrative Science Quarterly, Vol. 21 No. 3, 1976, pp. 246-75.

18. Shaw, M.J., "A Distributed Scheduling Method for Computer Integrated Manufacturing: The Use of Local Area Networks in Cellular Systems", International Journal of Production Research, Vol. 25 No. 9, 1987, pp. 1285-303.

19. Owens, T., Luh, P., Cochran, S. and Weisser, P., "A Hybrid Optimization and Knowledge-based Approach to Job Shop Scheduling", Proceedings Rensselaer's Second International Conference on Computer Integrated Manufacturing, 1990, p. 32.

20. Rana, S.P. and Taneja, S.K., "A Distributed Architecture for Automated Manufacturing Systems", International Journal of Advanced Manufacturing Technology, Vol. 3 No. 5, 1988, pp. 81-98.

21. Taneja, S.K., "Distributed Approach to Information Processing in Computer-integrated Manufacturing", PhD Thesis, Wayne State University, Detroit, MI, 1993.
22. Bechtel, W. and Richardson, R.C., Discovering Complexity: Decomposition and Localization as Strategies in Scientific Research, Princeton University Press, Princeton, NJ, 1993.

FURTHER READING

Joshi, S. and Smith, J.S., "Formal Models for Control of Flexible Manufacturing Systems", Proceedings of the 1993 NSF Design and Manufacturing Systems Conference, 1993, p. 1379.

Rossak, W. and Ng, P.A., "Some Thoughts on Systems Integration -- A Conceptual Framework", Journal of Systems Integration, Vol. 1 No. 1, 1991, pp. 97-114.

Rossak, W. and Ng, P.A., "System Development with Integration Architectures", Systems Integration '92 Proceedings of the Second

International Conference on Systems Integration, 1992, pp. 96-103.

Vernadat, F., Di Leva, A. and Giolito, P., "Organization and Information System Design of Manufacturing Environments: The New M* Approach", Integrated Manufacturing Systems, Vol. 2 No. 2, 1989, pp. 69-81.
Olugbenga O. Mejabi is in the Department of Industrial and Manufacturing Engineering, Wayne State University, Detroit, Michigan, USA.


?

18/9/1 (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)


02218645 79269434

**The net works**

Corbitt, Terry

Credit Management PP: 34-35 Sep 2001 ISSN: 0265-2099 JRNL CODE: CRM
DOC TYPE: Periodical; Cover Story LANGUAGE: English RECORD TYPE: Fulltext
LENGTH: 2 Pages
WORD COUNT: 1223
GEOGRAPHIC NAMES: United Kingdom; UK

DESCRIPTORS: Electronic commerce; Effects; Credit management; Finance companies; Technological planning
CLASSIFICATION CODES: 9175 (CN=Western Europe); 5250 (CN=Telecommunications systems & Internet communications); 2310 (CN=Planning); 8100 (CN=Financial services industry)
PRINT MEDIA ID: 14737

ABSTRACT: The development of electronic commerce and the impact of the Internet are changing the traditional ways in which business operates. One of the departments that has had to change is that of finance. In the past the finance function was perceived as the bean counting department, but from now on, it will drive rather than measure performance. Its traditional responsibilities, such as forecasting, budgeting and financial control will remain important but many of these processes will be automated. The new challenges for the finance function will lie in quantifying and challenging strategic decisions so that they create value.

TEXT: Terry Corbitt considers the impact of the Internet on business and examines the opportunities created by the new technology, particularly for those working in finance.

The development of electronic commerce and the impact of the Internet are changing the traditional ways in which business operates. One of the departments that has had to change is that of finance. In the past the finance function was perceived as the bean counting department, but from now on, it will drive rather than measure performance. Its traditional responsibilities, such as forecasting, budgeting and financial control will remain important but many of these processes will be automated. The new challenges for the finance function will lie in quantifying and challenging strategic decisions so that they create value. This will include monitoring performance against strategy, assessing the effectiveness

of business systems and measuring customer and employee satisfaction. Many leading organisations, such as Cisco, Motorola, Virgin and Whitbread are already implementing the necessary changes.

New role of finance

In practical terms this means that, in the future, the primary role of those within finance departments of large organisations will be as providers and integrators of information. This transition will require wholesale change within the department, both culturally and operationally. The financial director will move away from the traditional financial role and become more of a strategic consultant for the organisation.

Many tasks will be eliminated. Internet technology has transformed the way

in which financial transactions are processed. Many of the manual tasks, such as invoicing and payroll, will be done automatically. **Electronic procurement** will allow staff to **order goods** online direct from **suppliers** without having to pass purchase orders between departments. It has been estimated that by taking advantage of Internet based systems in this way organisations will be able to reduce costs by 20 per cent. Virgin Mobile has set up integrated systems for online sales and customer self service that make its ordering and fulfilment processes fully automated. Customer details not only go to the warehouse so that the order can be despatched but also straight to the customer database where the accounting transactions are automatically posted to the sales ledger. The whole process essentially looks after itself allowing the finance department to focus on other issues.

Shared service centres

During the 1990s many large organisations reduced costs and improved efficiences by locating all operational tasks in a shared service centre. These were limited by geographical barriers and time zones. New Internet technology does not suffer from these constraints. As organisations automate their

processes and link directly with both customers and suppliers, there will be no need for large accounting processing centres in a single location. Before long the shared service centres will essentially become control rooms for monitoring performance, managing processes and tracking exceptions to the rule.

For those organisations that are not big enough to justify setting up a dedicated shared services centre, Application Service Providers (ASPs) offer a solution. Organisations can outsource IT to an ASP which can service a number of organisations simultaneously, at an offsite location. It is anticipated that ASPs will be a popular option for many organisations.

Minimising increased risk

Improved systems and access to information across the organisation will enable directors and managers to make more informed decisions. However, there is a danger that as access to information increases, so do the potential risks for an organisation, particularly as many process will be automated and the finance department's time will be focused elsewhere. Rigorous risk management procedures will be needed and the new technology meets this demand by allowing consistent procedures, tools and templates to be implemented.

Cisco for example, has adopted a web based expenses system that simultaneously flags up consistent overspending on expenses or the use of unauthorised airlines or hotels.

Chief executives have always wanted financial directors to make the financial function into a strategic business partner within the organisation. The Internet offers a way of achieving this. In the past finance used to deliver a limited range of standard reports to the organisation's managers. These however, were rarely targeted to meet specific needs and only provided generic information which may, or may not, have been relevant to the receiver. By contrast the Internet not only makes the information readily available but it can be tailored to the needs of individual managers. Each employee can receive real time customised

management information through a web browser, anytime, anywhere. These personal portals effectively provide a single and instant version of the truth and create a fundamental change in business performance management by allowing every member of the organisation to manage their own performance against clear, organisation-wide strategic priorities. Motorola, for example, uses a system that not only enables all of its employees to have daily access to marketing information but also incorporates paging technology. Employees who are not near a computer can access the information they need, or be alerted to new developments, via a pager with a two minute response time.

By taking advantage of web and wireless technologies organisations can gather together all of the information that may be required, be it quantitative or qualitative, from internal or external sources, and disseminate it through a single mechanism that can be personalised to each individual employee. But technology, however advanced, will not translate into competitive advantage, no matter how much information is available, without a supporting strategic framework. This is where the new key role of the CFO lies. It is imperative is to ensure that this technology can make a difference, by ensuring that the information is relevant and makes meaningful analysis possible, by directing it accurately and by making sure controls are in place for managing risk in global and real time terms.

New opportunities

As the business environment undergoes these fundamental changes, finance will no longer be confined by the parameters of the organisation. It will have the opportunity to explore new relationships with customers, suppliers and partners. For example, Whitbread has developed its website as the primary source of information on the organisation, improving its investor relations by presenting the most relevant information in an accessible format.

The specialist skills typically found in finance, taxation, treasury, investor relations and corporate finance, are being profoundly affected by the Internet. This is having a two sided impact. First, on the way in which these traditional skills are delivered; for example, common tax and treasury questions can be answered over extranets or intranets. Second, there will also be an impact on the skills that are actually required, for example, Internet trading raises questions about the co-ordination of crossborder transactions. As the need for alliances increases, so does the amount and complexity of advice required.

Finance must respond to both of these challenges. In becoming much more project based, finance professionals must develop and revamp their skills. Electronic finance presents many new opportunities but these need to be supported by strong management and commercial skills in order that they are fulfilled. The new role of finance extends beyond the traditional limits and into a wider environment of customers and suppliers. It must not only ensure that electronic commerce initiatives within the organisation are complementary and coordinated but also that this level of co-ordination extends to relationships with suppliers, customers and partners. Finance will still hold the whole organisation together but its sphere of influence has widened dramatically.


?